REMARKS

Claims 1-32 are pending in the current application. In an Office Action dated October 5, 2005 ("Office Action"), the Examiner rejected claim 1 under 35 U.S.C. §102(e) as being anticipated by Stasiak, U.S. Patent Application Publication No. 2003/0230746 A1 ("Stasiak"), rejected claims 1-27 and 32 under 35 U.S.C. §102(e) as being anticipated by Krieger et al., U.S. Patent Application Publication No. 2004/0246768 A1 ("Krieger"), and rejected claims 1-3, 14, 15, and 28-32 under 35 U.S.C. §102(e) as being anticipated by Chow, U.S. Patent No. 6,646,903 B2 ("Chow"). Applicants' representative respectfully traverses the 35 U.S.C. §102(e) rejections of claims 1-32.

In the Office Action, on page 6, the Examiner responds to a Rule 131 Affidavit submitted by Applicants' representative on July 15, 2005, as follows:

> The evidence submitted is insufficient to establish diligence from a date prior to the date of reduction to practice of the Stasiak reference to either a constructive reduction to practice or an actual reduction to practice. The evidence submitted only discloses the chemical composition of and process of making polymers, which has nothing to do with the claimed invention. There is nothing in the evidence that suggests diligence in making an organic-polymer-based memory element comprising two overlapping conductive signal lines, which is the claimed invention.

Applicants' representative confesses to be bewildered by this statement. The affidavit submitted on July 15, 2005, includes eight exhibits dated from March 11, 2002, to June 7, 2002, all prior to the July 14, 2002 filing date of Stasiak. These exhibits show a variety of different data collected from experimental investigation of memory devices, or switches, fabricated from organic polymers and overlapping conductive materials according to the current invention. For example, Exhibit 1 shows two current/voltage curves obtained by measuring the current through memory-element embodiments of the current invention comprising a 3, 4, 9, 10-perylenetetracarboxylic dianhydride ("PTCDA") organic layer sandwiched between aluminum and silver electrodes, as clearly shown in the legends of the figures. Contrary to the Examiner's statement, such current/voltage curves are not directed to the chemical composition of, or process of making, polymers, but instead show observed electronic characteristics of a memory-element embodiment of the present

invention. Current/voltage curves are direct, experimental data obtained from devices. The remaining exhibits include similar, detailed materials showing observed electronic characteristics of various memory-element embodiments of the present invention. For example, Exhibit 3 discusses a memory element comprising a PTCDA layer sandwiched between a *p*-silicon substrate and a gold contact. As another example, on the third page of Exhibit 4, an illustration of the changes observed in a cathode of a memory-element device after stressing the device is shown. The terms "cathode" and "device" clearly reference an electronic device, and not the chemical composition of, or process of making, a polymer. On the first page of Exhibit 8, as yet another example, a diagram of a memory element is shown with an upper gold contact, a poly(3,4-ethylenedioxythiophene) ("PEDT") poly(styrenesulfonate) ("PSS") organic layer, and a lower indium-tin oxide ("ITO") conductive element. Indeed, Exhibit 6 does include several pages of chemical structures, but this represents only a tiny fraction of the material included in Exhibits 1-8.

Applicants' representative is left with the impression that the Examiner has not read the Rule 131 Affidavit submitted on July 15, 2005, and has based the comments included in the Office Action on earlier comments in an earlier office action directed to the first Rule 131 Affidavit submitted by Applicants' representative on January 27, 2005. That Rule 131 Affidavit included the formal disclosure materials submitted by Applicants to the Hewlett-Packard Company on July 30, 2002. Together, the two Rule 131 Affidavits submitted by Applicants' representative unambiguously show conception of the current invention and reduction to practice of the current invention prior to the June 14, 2002, filing date of Stasiak, as well as diligence in pursuing the constructive reduction to practice represented by the current application. Applicants' representative respectfully requests the Examiner to carefully read and reconsider the two Rule 131 Affidavits submitted by Applicants' representative. In Applicants' representative's opinion, Stasiak is not prior art according to 35 U.S.C. §102(e) which states:

> A person shall be entitled to a patent unless
> (e) the invention was described in

> (1) an application for patent, published under Section 122(b), by another filed in the United States before the invention by the applicant for patent. . .

Claim 1 is representative of the claims of the current application, and is provided below for the Examiner's convenience:

> 1. An organic-polymer-based memory element comprising:
> two overlapping conductive signals lines; and
> at least one organic polymer layer within the region of overlap between the two signal lines, the organic polymer layer having at least two detectable memory states, transitions between which arise from one of changes in chemical bonds and changes in organic polymer doping.

Claim 1 is thus directed to an organic-polymer-based memory element with an organic polymer layer in which changes in chemical bonds or changes in organic-polymer doping lead to two different, detectable memory states.

The Examiner cites paragraph [0023] of Stasiak as teaching or disclosing an organic-polymer layer within a memory element in which transitions between memory states arise from changes in chemical bonds or changes in organic polymer doping. As discussed above, Stasiak is not a citable reference, having a filing date later than Applicants' reduction to practice of the claimed invention. Moreover, paragraph [0023] of Stasiak does not mention transitions between detectable memory states. Instead, the paragraph merely describes organic doping material in a polymer host or binder. In the cited paragraph, Stasiak states that the "particular molecule or functional group utilized will depend on the particular electrical characteristics desired for memory device 100, as well as the particular application memory device will be utilized in." This, however, falls far short of teaching a memory element in which transitions between detectable memory states arise from changes in chemical bonds or organic-polymer doping. The Examiner hopefully appreciates that conductive polymers and doped conductive polymers are well known in the fields of electronics and materials science. The current claim 1, quoted above, is not merely directed to a memory element containing an organic-polymer layer, but instead to a memory element in which transitions between detectable memory states arise from changes in chemical bonds or organic-polymer doping. Transitions between detectable memory states in an

organic-polymer layer do not imply changes in chemical bond of in organic-polymer doping. Such transitions may result from conformational changes, macromolecular structural changes, changes in polymer orientations, and from many other changes that do not involve changing chemical bonds or organic-polymer doping. Paragraph [0023] of Stasiak neither discloses, teaches, mentions, nor suggests memory-state transitions of any kind, and neither makes mention .nor suggests memory-state transitions that involve chemical-bond changes or organic-polymer doping changes.

Similarly, the Examiner cites paragraph [0019] of Krieger for teaching transitions between detectable memory states arising from changes in chemical bonds or changes in organic-polymer doping. However, the cited paragraph of Krieger only states that the "described implementation of the functional zone allows to create a structure capable of changing the active layer resistance and/or forming high conductive areas or lines in the active layer under external electric and/or light radiation effect on the memory cell and retaining the state for a long time without applying external electric fields. Earlier in the paragraph, Krieger proposes a wide variety of different types of memory-element materials, including organic materials, inorganic materials, and other more specific embodiments. However, nowhere in paragraph [0019] does Krieger mention transitions between detectable memory states arising from changes in chemical bonds or changes in organic-polymer doping. Changes in resistance or conductivity do not imply changes in chemical bonds and/or changes in organic-polymer doping, as discussed above, but may arise from a wide variety of different types of conformational and orientation changes that do not involve changes in chemical bonds or organic-polymer doping.

Similarly, the Examiner cites column 2, lines 11-25 of Chow for teaching an organic-polymer layer in which transitions between detectable memory states arise from changes in chemical bonds or changes in organic polymer doping. However, the cited portion of Chow, and several additional sentences following the cited portion of Chow, merely state that data is stored by an application of an electric field through electrodes between which an organic polymer layer is sandwiched. Chow explicitly states that the organic material "has properties such that polarization shifts remain after removal of the field." Again, as with the citations of paragraphs in Stasiak and Krieger, the cited portion of Chow does not teach, mention, or suggest transitions between detectable memory states arising from changes in chemical

bonds or organic-polymer doping. Changes in polarization do not imply changes in chemical bonds and/or changes in organic-polymer doping.

Claims 2-32 all depend either directly or indirectly from claim 1, and are not therefore anticipated by any of the cited references for the same reason that claim 1 is not anticipated. Moreover, specific rejections of many of the dependent claims are completely unsupported by the cited references. For example, claim 4 is directed to embodiments of the present invention in which organic-polymer dopants are active in one memory state and inactive in another memory state. The Examiner cites Figure 5 of Krieger as anticipating claim 4. Neither Figure 5 of Krieger nor any text referencing Figure 5 in Krieger teach, disclose, mention, or suggest a memory cell in which organic-polymer dopants are active in one memory state and inactive in another memory state. To anticipate a claim, a reference must teach or disclose each and every element of a claim. A simple figure representing a memory element cannot possibly teach or disclose differentiable memory states that depend on the activity of organic-polymer dopants. As another example, the Examiner cites Figure 5 with respect to all of claims 4-13, which are directed to a variety of different embodiments of the present invention, including embodiments that involve polymer alignments, disordered and ordered states of polymers, and many other embodiments. There is no mention or suggestion of any of these embodiments in Figure 5 of Krieger, or in those portions of Krieger that reference Figure 5. The Examiner states that the "organic polymer layer and additional layer inherently have all of the memory-state transition properties of the claims because the structure and materials are the same as those of the claimed invention." However, the structure of organic polymer materials, and characteristics and properties of such materials in an electronic device, depend critically on methods of preparing the materials, concentrations of dopants and other additives, polymer-chain lengths, exact chemical composition of various substituents and functional groups, degree of cross-linking within the polymers, operational regimes and characteristics of devices constructed from the materials, and many different additional characteristics. None of these parameters and characteristics are specified or suggested in Krieger. From a materials science or chemical perspective, the above quoted statement is absolutely unsupported and unsupportable.

In Applicants' representative's opinion, all of the claims remaining in the application are now clearly allowable. Favorable consideration and a Notice of Allowance are earnestly solicited.

Respectfully submitted,
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